UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/610,933	07/06/2000	Frederick Herbert Raab	GMRR PA00-3	5138

7590 01/25/2005

JAMES MARC LEAS
37 BUTLER DRIVE
S. BURLINGTON, VT 05403

EXAMINER	
SHINGLETON, MICHAEL B	
ART UNIT	PAPER NUMBER
2817	

DATE MAILED: 01/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/610,933	RAAB, FREDERICK HERBERT	
	Examiner	Art Unit	
	Michael B. Shingleton	2817	

-- Th MAILING DATE of this c mmunication appears on th cov r sh t with th correspondenc addr ss --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11-5-2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-64* is/are pending in the application.

4a) Of the above claim(s) *10-12,20-27 and 47-55* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9,13-19,28-34,36-38,41-46 and 56-64* is/are rejected.

7)☒ Claim(s) *35 and 39* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claim 1-5, 7, 13, 15, 16, 28, 29, 40 and 56-64 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Ishii 5,862,458 (Ishii).

Figures 1 and 2, and the relevant text of Ishii discloses an electronically tuned circuit having a power amplifier 2, and a tunable output network 8 (Also as shown in Figure 2 See the paragraph bridging columns 3 and 4.) coupled to the output of the power amplifier, and a control circuit composed of a at least element 7 that forms a device in which a control line that extends between the element 7 and the electronically tunable reactive component 8(83). Note that this line is where the "CONTROL SIGNAL" of Figure 1 points. Being that element 83 is a varactor diode it clearly is a "tunable reactive component includes non-motor operated electronic tuning when said power amplifier is operated in said large-signal mode". The control signal of Ishii is varied i.e. it has more than two values and these values are proportional to the value of the power derived from the power amplifier. (See column 7 around line 6). Since the electronically tunable reactive component is a varactor the output network being one that changes in impedance is clearly tuned to a selected frequency, Note column 6 around line 13 that recites the automatic controls maintaining an impedance match for varying load impedance. Note that a varying load impedance will change the power detected and thus in accordance with the teachings of Ishii the impedance match will be maintained. Since the term "predetermined amount" means any amount a "predetermined set of tuning inputs" means any set of tuning inputs. Since there are an infinite number of tuning inputs for Ishii thus representing a set of tuning inputs, Ishii clearly meets the claim language. Note that Figure 2 of Ishii shows at least three other reactive components connected as part of the tuned circuit. Note that the control signal is a voltage (Note that element 83 is a varactor that needs a voltage to provide the recited control.). Note the claims recite that the "output network is adapted to modulate the signal (emphasis added)". Since the control voltage controls the capacitance of the output network, the

output network of Ishii is capable of modulating the signal which is all that is required by the intended use limitation of "adapted to". Because the capacitance is varied the signal is inherently modulated. As noted in the previous office actions, the fact that an impedance matching operation is preformed means that the power-amplifier load-impedance locus that substantially maximizes power-amplifier efficiency inherently occurs. If the impedance was not matched then a reflection of power would occur that clearly does not result in a load-impedance locus that maximizes the power amplifier efficiency. Note that the diode 703 forms a envelope detector that detects the power and being that the power amplifier is responsive to the input RF signal so is the diode 703. Note that with no input signal there is no signal to detect via diode 703. Note the modulation input, namely the signal directly applied to element 1 and 4. Also note that the control signal is actually a series of tuning signals. Thus the controller formed of at least element 7 as noted above is for converting a modulation input into tuning signals for control of the electronically tuned network. Also note the use of fixed reactance elements in Figure 2 of Ishii. These fixed elements will provide a optimum operation for a first frequency.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 6, 8, 9, 14, 17-19, 30-34, 36-38, 41-46,are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishii 5,862,458 (Ishii).

Figures 1 and 2, and the relevant text of Ishii discloses an electronically tuned circuit having a power amplifier 2, and a tunable output network 8 (Also as shown in Figure 2 See the paragraph bridging columns 3 and 4.) coupled to the output of the power amplifier, and a control circuit composed of a at least element 7 that forms a device in which a control line that extends between the element 7 and the electronically tunable reactive component 8(83). Note that this line is where the "CONTROL SIGNAL" of Figure 1 points. Being that element 83 is a varactor diode it clearly is a "tunable reactive component includes non-motor operated electronic tuning when said power amplifier is operated in said large-signal mode". The control signal of Ishii is varied i.e. it has more than two values and these values are proportional to the value of the power derived from the power amplifier. (See column 7 around line 6).

Since the electronically tunable reactive component is a varactor the output network being one that changes in impedance is clearly tuned to a selected frequency, Note column 6 around line 13 that recites the automatic controls maintaining an impedance match for varying load impedance. Note that a varying load impedance will change the power detected and thus in accordance with the teachings of Ishii the impedance match will be maintained. Since the term "predetermined amount" means any amount a "predetermined set of tuning inputs" means any set of tuning inputs. Since there are an infinite number of tuning inputs for Ishii thus representing a set of tuning inputs, Ishii clearly meets the claim language. Note that Figure 2 of Ishii shows at least three other reactive components connected as part of the tuned circuit. Note that the control signal is a voltage (Note that element 83 is a varactor that needs a voltage to provide the recited control.). Note the claims recite that the "output network is adapted to modulate the signal (emphasis added)". Since the control voltage controls the capacitance of the output network, the output network of Ishii is capable of modulating the signal which is all that is required by the intended use limitation of "adapted to". Because the capacitance is varied the signal is inherently modulated. As noted in the previous office actions, the fact that an impedance matching operation is preformed means that the power-amplifier load-impedance locus that substantially maximizes power-amplifier efficiency inherently occurs. If the impedance was not matched then a reflection of power would occur that clearly does not result in a load-impedance locus that maximizes the power amplifier efficiency. Note that the diode 703 forms a envelope detector that detects the power and being that the power amplifier is responsive to the input RF signal so is the diode 703. Note that with no input signal there is no signal to detect via diode 703. Note the modulation input, namely the signal directly applied to element 1 and 4. Also note that the control signal is actually a series of tuning signals. Thus the controller formed of at least element 7 as noted above is for converting a modulation input into tuning signals for control of the electronically tuned network. Also note the use of fixed reactance elements in Figure 2 of Ishii. These fixed elements will provide a optimum operation for a first frequency.

Ishii does not specify that the output network be further adapted to follow a substantially resistive power-amplifier impedance locus, thereby maintaining power amplifier efficiency near maximum. However, this selection is merely the selection of the optimum or workable range. Note the words "maximum" and "efficiency". Also note that the output network 8 of Ishii is a matching element. Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to select the operating point of the output network to follow a substantially resistive power-amplifier impedance locus thereby operating the network at optimum efficiency as admitted by applicant since this merely involves the selection of the optimum or workable range that involves but routine skill

in the art and since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art.

Ishii is silent on the use of a control system that employs a look-up table and a digital signal processor to provide the control signal and to modulate the input signal. The control system of Ishii is seen as a hard-wired controller.

Nevertheless, as one of ordinary skill in the art would have known, controllers employing look-up tables and digital signal processors (microprocessors and the like.) are a well-known art recognized equivalent conventional form of controller and are a well-known art recognized conventional form of modulator.

Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have substituted the conventional look-up table with a microprocessor controller in place of the controller of Ishii because such is an art recognized equivalent form of controller. One of ordinary skill in the art would have additionally been motivated to make the obvious substitution for the controller that employs a processor and associated look-up tables is programmable thus allowing for changes in the future should they become necessary. Furthermore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have utilized a microprocessor with look-up table system to modulate the input signal because, as the Ishii reference is silent on the exact modulation circuit one of ordinary skill in the art would have been motivated to use any art-recognized equivalent modulation circuit such as the conventional modulator that employs a digital signal processor and look-up table.

Ishii specifically recites that a varactor can form the variable capacitance element, however, Ishii is silent on this variable capacitance element being a micro electro-mechanical system device, or a transistor, or a variable-dielectric material tunable capacitor device, or a piezo-electric tunable capacitor device. A micro electro-mechanical system device, a transistor, a variable-dielectric material tunable capacitor device and a piezo-electric tunable capacitor device are well-known forms of variable capacitance element.

Accordingly it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize a micro electro-mechanical system device, or a transistor, or a variable-dielectric material tunable capacitor device, or a piezo-electric tunable capacitor device as the variable capacitance element in Ishii since the examiner takes Official Notice of the equivalence of the micro electro-mechanical system device, the variable-dielectric material tunable capacitor device, or a piezo-electric tunable capacitor device to the varactor for their use in the amplifier and variable reactance art

and the selection of any of these known equivalents to vary capacitance would be within the level of ordinary skill in the art.

Claims like claim 30 recites that there is a "drive-level adjuster" that adjusts the amplitude of the signal provided to the power amplifier. Ishii is silent on the type of modulator 1 that is employed.

An amplitude modulator is a well-known conventional form of modulator use to modulated an RF signal to be transmitted.

Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have employed an amplitude modulator for the modulator of Ishii because, as the Ishii reference is silent on the exact modulator circuit employed one of ordinary skill in the art would have been motivated to use any art-recognized equivalent modulator circuits such as the conventional amplitude modulator.

Ishii is silent on there being a bias input for setting the bias level of the power amplifier.

A power amplifier is commonly composed of a transistor with a bias input where a bias supply is connected. This input thus sets the bias level of the power amplifier via the bias supply.

Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have employed a power amplifier composed of a transistor with a bias input where a bias supply is connected for the power amplifier arrangement of Ishii because, as the Ishii reference is silent on the power amplifier arrangement employed one of ordinary skill in the art would have been motivated to use any art-recognized equivalent power amplifier circuit such as the conventional power amplifier that employs a transistor with a bias input connected to a bias supply.

The selection of the bias point i.e. the class of operation such as class E is merely the selection of the optimum or workable range. Selecting the bias point is the selecting of the class of operation.

Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected the bias point to be a the minimum level necessary to enable operation of the power amplifier or class E as these selections are the selection of the optimum or workable range that involves routine skill in the art.

As to the selection of the fixed reactive elements to be optimum for a first frequency at class E operation, Ishii is silent on this feature. However, this too is merely the selection of the optimum or workable range.

Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected the reactive values to be optimum of r a first frequency when in class E operation and to tune element 8 for a second frequency when in class E operation since these selections are the

selection of the optimum or workable range that involves routine skill in the art. Note that the impedance is dependent on frequency.

As to the selection of suboptimum class E operation when the circuit is delivering less than the maximum output signal, Ishii is silent on this feature. However, this too is merely the selection of the workable range.

Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected the reactive values to be optimum for maximum signal output and suboptimum class E operation when the circuit is delivering less than the maximum output signal since these selections are the selection of the workable range that involves routine skill in the art.

Claims 35 and 39 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael B. Shingleton whose telephone number is (571) 272-1770. The examiner can normally be reached on Tues-Fri from 8:30 to 4:30. The examiner can also be reached on alternate Mondays. The examiner normally has the second Mondays of the bi-week off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Pascal, can be reached on (571)272-1769. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MBS
Jan 21, 2004

MICHAEL B SHINGLETON
PRIMARY EXAMINER
GROUP ART UNIT 2817